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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/828,475	04/21/2004	Yoshihisa Dotta	1035-506	7094

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EXAMINER

NADAV, ORI

ART UNIT PAPER NUMBER

2811

DATE MAILED: 09/26/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/828,475

Applicant(s)

DOTTA ET AL.

Examiner

Ori Nadav

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 July 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,4-9 and 17-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,4-9,17-22,24-26 and 28 is/are rejected.
- 7) ☒ Claim(s) 23 and 27 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-2, 4, 7, 9, 17-21 and 28 are rejected under 35 U.S.C. 102(e) as being anticipated by Hayakawa (6,450,621).

Hayakawa teaches in figures 13B and 17 and related text a semiconductor apparatus, comprising:

a semiconductor substrate 1 (see figure 13A);

a field oxide film 15 formed over a surface of the semiconductor substrate, the field oxide film having an aperture section;

a pad electrode 21, having an aperture section formed there-through, the pad electrode being formed over the field oxide film so as to overlap the field oxide film when perpendicularly viewing the semiconductor substrate, and

a penetration electrode 51 electrically connected to the pad electrode 32, the penetrating electrode being provided so as to pass through each of (a) the aperture section of the field oxide film, (b) a hole formed in the semiconductor substrate, and (c) the aperture section of the pad electrode,

the hole in the semiconductor substrate being formed entirely in the aperture section of the field oxide film, when perpendicularly viewing the semiconductor substrate, so that an opening of the hole is smaller than the aperture section of the field oxide film,

wherein the penetration electrode is formed in a field area of the surface of the semiconductor substrate,

wherein the aperture section of the field oxide film is formed in the aperture section of the pad electrode, when perpendicularly viewing the semiconductor substrate,

wherein the penetration electrode includes a hole-filling section formed in the hole,

wherein the hole-filling section is made of an electrically conductive material,

wherein a pad electrode formed so that there is no overlap with the hole when perpendicularly viewing the semiconductor substrate.

Regarding the claimed limitation of a pad electrode having an aperture section formed there-through, as recited in claims 1, 18 and 19, is taught by Hayakawa, because the device comprises plurality of inkjet heads 112B, 112C, 112M, 112Y (see figure 17) adjacent to each other making one device 112. Each of these inkjet heads includes a pad electrode 21. Therefore, viewing device 112 from above, an aperture section exists between pad electrode 21. Therefore, Hayakawa teaches a pad electrode having an aperture section formed there-through, as claimed.

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Regarding claim 21, Hayakawa teaches in figures 13B the aperture section in the pad electrode is larger than the aperture section in the field oxide film, when perpendicularly viewing the semiconductor substrate.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 5-6, 8, 22 and 24-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hayakawa in view of Finnila (5,426,072).

Regarding claim 5, Hayakawa teaches substantially the entire claimed structure, as applied to claim 1 above, except an insulating film is formed on an internal surface of the hole, between the internal surface of the hole and a sidewall of the penetration electrode,

Finnila teaches in figure 4 and related text an insulating film 15 is formed on an internal surface of the hole, between the internal surface of the hole and a sidewall of the penetration electrode.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to form an insulating film on an internal surface of the hole, between the internal surface of the hole and a sidewall of the penetration electrode, in

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Hayakawa's device in order to improve the characteristics of the device by providing protection to the penetrating electrode.

Regarding claims 6 and 8, prior art's device comprises a penetration electrode includes an electrically conductive film 16 on the insulating film that is formed on the internal surface of the hole,

wherein the hole-filling section is made of an insulating material and of an electrically conductive material,

wherein the insulating film is in direct contact with the field oxide film.

Regarding claims 24-26, Hayakawa does not explicitly state that the penetration electrode which extends through the aperture section of the pad electrode is located at elevations both above and below the pad electrode.

Finnila teaches the penetration electrode extends to an external connection.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to extend the penetration electrode to an external connection such that the penetration electrode is located at elevations both above and below the pad electrode in Hayakawa's device in order to provide external connections to the device.

Allowable Subject Matter

Claims 23 and 27 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

Applicant's arguments with respect to claims 1-2, 4-9 and 17-28 have been considered but are moot in view of the new ground(s) of rejection and objections to claims 23 and 27.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ori Nadav whose telephone number is 571-272-1660. The examiner can normally be reached between the hours of 7 AM to 4 PM (Eastern Standard Time) Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Lee can be reached on 571-272-1732. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



O.N.
9/21/06

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